

NON-PUBLIC?: N  
ACCESSION #: 8811290117  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: BIG ROCK POINT PAGE: 1 OF 3

DOCKET NUMBER: 05000155

TITLE: REACTOR TRIP ON LOW CONDENSER VACUUM FOLLOWING LOAD  
REJECTION

EVENT DATE: 10/28/88 LER #: 88-008-00 REPORT DATE: 11/23/88

OPERATING MODE: N POWER LEVEL: 095

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: R. J. Alexander, Technical Engineer TELEPHONE: 616 547-6537

COMPONENT FAILURE DESCRIPTION:

CAUSE: C SYSTEM: FK COMPONENT: ROD MANUFACTURER: 0030

REPORTABLE TO NPRDS: N

CAUSE: B SYSTEM: AA COMPONENT: MG MANUFACTURER: G080

REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 28, 1988 at 1630 hours, control room alarms indicated that a load rejection occurred due to loss of the transmission line. The turbine bypass valve opened to control reactor pressure and the turbine runback feature actuated, however, within 10 seconds a reactor and turbine trip occurred on low condenser vacuum due to large amount of steam flow into the condenser from the bypass valve. All control rods inserted following trip initiation. The turbine trip resulted in a momentary loss of station power for less than 5 seconds until automatic transfer to the backup offsite power source was completed. During this transition the Control Rod Drive M/G set failed to transfer causing a loss of position indication until operators reclosed the normal supply breaker. All other systems functioned properly.

Subsequent investigation showed the cause of the load rejection was a lightning rod which broke off during high winds and caused a fault on the transmission line approximately 10 miles from the plant site.

Following check-out of the transmission line, repair of the M/G set, and testing the plant was returned to service on October 29, 1988.

END OF ABSTRACT

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### Description

On October 28, 1988 the plant was operating at 95 percent power with all safety systems in service. At 1630 hours, control room alarms (IB) were received indicating that a load rejection had occurred due to a loss of the 138kV transmission line (FK). As designed the Turbine Bypass Valve (JI) opened to control reactor pressure and the Turbine Control System (JJ) transferred to Synchronous Governor (65) to reduce output to station load. Within 10 seconds after the load rejection a reactor protection system (JC) trip and turbine (TG) trip occurred on Low Condenser (SG) Vacuum. All control rods (AA) inserted following the reactor trip initiation. The turbine/generator (TG) trip resulted in a momentary loss of station power until the automatic transfer to the back-up 46 kV offsite power source (FK) was completed. Operators manually started a feedwater (SJ) pump (P) and both Recirculating (AD) Pumps immediately after the transfer was complete. The Emergency Diesel Generator (DG) started on the loss of station power but did not need to tie to the emergency bus (BU) since station power was restored following the 46kV transfer. During this transition the Control Rod Drive M/G set (MG) failed to transfer causing a loss of position indication. Indication was restored approximately 8 minutes later when an auxiliary operator transferred position indication back to the normal supply. All other safety systems functioned properly during the event. The plant was maintained in hot condition.

Following investigation and system check-out the 138kV transmission system was returned to service at 2215 hours. Station load was transferred back to this source and the 46kV source was returned to standby status.

After maintenance and testing activities were complete, plant start-up commenced on October 29 at 1909 hours.

### Cause

The cause of the load rejection was a fault on the 138kV transmission system. The fault occurred when a lightning rod (ROD) broke off its mount during high winds and fell on one phase of the power line. Relays (RLY) detecting the fault condition tripped both the plant's and transmission substation's 138kV oil circuit breaker (52) to isolate the fault. Although Big Rock Point has two offsite power ties (138kV, 46kV) only the 138kV can be utilized to carry load

from the generator, thus the turbine's output reduced to station load requirements until the reactor trip.

Big Rock Point was designed with a 100 percent Turbine Bypass Capacity, wherein the turbine runback to station load should occur without a reactor trip. However, experience has shown that the ability of the plant to react to this transient is dependent on reactor power prior to event. At high powers (greater than 70 percent), upsets in the secondary side can lead to reactor

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trip. In this case (95 percent power), low condenser vacuum condition resulted due to the large amount of steam flow resulting from the turbine bypass valve being open.

The failure of Control Rod Position M/G set was attributed to a "burnt" contact on the output relay.

#### Corrective Actions

Prior to restoring the 138kV line to service, Consumers Power technicians confirmed that all relay operations were appropriate and that the fault condition had cleared. Prior to synchronizing the unit back to the 138kV line a visual inspection was performed by the transmission line crew to verify cause and assure no other anomalies existed.

Repairs to the Control Rod Drive M/G set were completed and unit was tested prior to restart.

#### Actions to Prevent Recurrence

The ability of Big Rock Point to mitigate a load rejection at high power levels has been under investigation to recommend and implement system improvements. This project has been carried as Issue Number BN-016, Secondary System Instabilities, of the Big Rock Point Integrated Plan. The goal of this effort is to mitigate the effects of a load rejection transient without a reactor trip by improving secondary side performance.

#### Safety Assessment

Loss of load is an anticipated and analyzed transient. All safety systems performed as required to maintain parameters within the design basis. All control rods inserted on the reactor scram and the turbine bypass valve controlled reactor pressure which negated the need to use the Emergency Condenser System (BL). All electrical systems functioned as designed in response to the loss of station power except for the Control Rod Drive MG set

(as discussed earlier). However, loss of position indication occurred after operators verified all rods were inserted and even if position indication was lost prior to rod insertion, shutdown could be verified by neutron instrumentation response.

ATTACHMENT 1 TO 8811290017 PAGE 1 OF 1

Consumers  
Power

POWERING  
MICHIGAN'S PROGRESS

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November 23, 1  
88

Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT -  
LICENSEE EVENT REPORT 88-008 - REACTOR TRIP ON LOW CONDENSER  
VACUUM  
FOLLOWING LOAD REJECTION

Licensee Event Report (LER) 88-008 (Reactor Trip on Low Condenser Vacuum Following Load Rejection) is attached. This event is reportable to the NRC per 10CFR50.73(a)(2)(iv).

Kenneth E Marbaugh  
Plant Licensing Engineer

CC Administrator, Region III, NRC  
NRC Resident Inspector - Big Rock Point Plant

Attachment

\*\*\* END OF DOCUMENT \*\*\*  
ACCESSION #: 8811290161

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